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10/767,658	01/29/2004	Masaki Okamoto	NGB-36409	5389

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EXAMINER	
PATEL, SHAMBHAVI K	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/767,658	OKAMOTO ET AL.	
	Examiner	Art Unit	
	SHAMBHAVI PATEL	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1 and 3-19 have been presented for examination.

Response to Arguments

2. Applicant's arguments filed September 10, 2009 regarding the prior art rejection have been fully considered but are moot in view of the new grounds of rejection presented below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent..

3. **Claim 1, 4-8 and 10-19 rejected under 35 U.S.C. 102(a)** as being clearly anticipated by **Yang ("Modeling and Implementation of a Neurofuzzy System for Surface Mount Assembly Defect Prediction and Control").**

Regarding claim 1:

Yang discloses a mounting process simulation program on a computer that executes a simulation of a mounting process composed of a plurality of steps comprising a solder printing step, a part mounting step, and a reflow step, the program causing the computer to execute:

a. a solder printing simulation executing step of executing a simulation based on a solder printing condition selected for the solder printing step **(figure 10: input parameters; figure 1: "screen printing")**

b. a part mounting simulation deciding step of selecting a simulated result from the solder printing simulation executing step as a part mounting simulation condition **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time)**

c. a part mounting simulation step of executing a simulation of the part mounting step based on a part mounting condition comprising the part mounting simulation condition **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time; figure 3: output from screen printing inputted into "component placing"; figure 10: input parameters)**

d. a reflow simulation condition deciding step of selected a simulated result from the part mounting simulation executing step as a reflow simulation condition **Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time**; and

e. a reflow simulation executing step of executing a simulation of the reflow step based on a reflow condition comprising the part mounting simulation condition and the reflow simulation condition **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time; figure 3: output from screen printing inputted into "component placing" and output from that is inputted into "reflow soldering"; figure 10: input parameters)**

Regarding claim 4:

Yang discloses executing the simulation of the second step by converting the analysis result data generated by other device into predetermined data format **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time; figure 3: output from screen printing inputted into "component placing"; figure 10: input parameters).**

Regarding claim 5:

Yang discloses the simulation program of claim 4 wherein the experimental data simulated at every step via a CAE tool is selected as the analysis result data **(section 4 "Empirical Illustration"),** wherein the type of data selected as the analysis result data is converted to a predetermined format **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time; figure 3: output from screen printing inputted into "component placing"; figure 10: input parameters).**

Regarding claims 6 and 19:

Yang discloses a mounting process simulation program according to claim 1, further causing the computer to execute an animation displaying step of displaying three-dimensionally an animation to indicate a result simulated in the part mounting simulation executing step on a display device, by reading previously- stored animation elements based on a definition file in which an operation sequence is defined every step **(figure 10: GUI model).**

Regarding claim 7:

Yang discloses a mounting process simulation program according to claim 1, wherein the part mounting simulation executing step includes a condition acquiring step of reading a condition selected in response to an input from a condition database in which a plurality of conditions are stored previously in combination, and adding the condition to the part mounting condition **(page 638: values from database).**

Regarding claim 8:

Yang discloses a mounting process simulation program according to claim 7, wherein the condition acquiring step further reads data from a CAD system in response to the input and adds the data to the part mounting condition **(figure 10: input parameters into GUI model).**

Regarding claim 10:

Yang discloses a mounting process simulation program according to claim 1, wherein the solder printing simulation executing step executes the simulation based on a change of a control item set in the solder printing step as the solder printing condition, the simulation condition deciding step decides the result simulated based on the change of the control item in the solder printing simulation executing step as the simulation condition, and the part mounting simulation executing step executes the simulation of the part mounting step based on the part mounting condition to contain the result simulated based on at least the change of the control item **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time; figure 3: output from screen printing inputted into "component placing"; figure 10: input parameters).**

Regarding claim 11:

Yang discloses a mounting process simulation program according to claim 1, further causing the computer to execute a reliability evaluating step of executing a reliability evaluation of a product manufactured in the mounting process by using the result simulated in the part mounting simulation executing step **(figure 10)**.

Regarding claim 12:

Yang discloses a mounting process simulation program according to claim 1, further causing the computer to execute a fraction defective calculating step of calculating a fraction defective of a product manufactured in the solder printing step and the part mounting step, by using simulated results which were simulated in the solder printing simulation executing step and the part mounting simulation executing step **(page 642 step 4: identification of defects)**.

Regarding claim 13:

Yang discloses a mounting process simulation system provided to steps of a mounting process composed of a plurality of steps comprising a solder printing step, a part mounting step, and a reflow step to execute a simulation of the mounting process, comprising:

a. an inputting portion for inputting a plurality of conditions to execute the simulation **(page 641 step 5: input process parameters)**

b. an executing portion for executing the simulation based on the condition input from the inputting portion **(page 641 step 5: predicts results for the purpose of defect prediction and control)**

c. an outputting portion for outputting a result of the simulation executed by the executing portion **(page 641 step 5: outputs results)**

d. wherein the executing portion includes:

i. a condition table forming portion that forms a condition table of a part mounting step positioned subsequently to a solder printing step, whereby the condition table is formed by using a simulation result simulated based on a solder printing condition selected for at least a solder printing step, of a part mounting step positioned subsequently to a solder printing step **(figure 10: conditions for the mounting, reflow, and printing step are listed subsequent to one another).**

ii. simulation result outputting portion executes the simulation of the part mounting step based on the condition data from the condition table and a condition input from the inputting portion **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time; figure 3: output from screen printing inputted into "component placing" and output from that is inputted into "reflow soldering")** and outputs a result to the outputting portion **(figure 10: display of results).**

e. wherein analysis result data analyzed based on a plurality of conditions are generated at every step and wherein the executing portion executes the simulation of the part mounting step by sampling the analysis result data generated based on the simulation condition **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will**

integrate the key parameters from different stages at the same time; figure 3: output from screen printing inputted into "component placing" and output from that is inputted into "reflow soldering").

Regarding claim 14:

Yang discloses a mounting process simulation program of causing a computer to execute a simulation of a mounting process composed of a plurality of steps, and a method of executing a simulation, comprising:

a. a solder printing simulation executing step of executing a simulation **(page 641 step 5: predicts results for the purpose of defect prediction and control)** based on a solder printing condition selected for a solder printing step **(figure 10: input parameters; figure 1: "screen printing")**.

b. a simulation condition deciding step of selecting a simulated result from the solder printing simulation executing step as a simulation condition for a part mounting step positioned subsequent to the solder printing step **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time)** .

c. a part mounting simulation executing step of executing a simulation-of the part mounting step based on a part mounting condition containing at least the simulation condition and a third condition **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time; figure 3: output from screen printing inputted into "component placing"; figure 10: input parameters)** that yields a part mounting simulation result that is displayed **(Table 2),** wherein the solder printing simulation executing step and the part mounting simulation executing step are each directed to different successive steps in the plurality of steps composing the mounting process **(figure 1)**

d. wherein analysis result data analyzed based on a plurality of conditions are generated at every step and wherein the part mounting simulation executing step executed the simulation of the part mounting step by sampling the analysis result data generated based on the part mounting condition **(Introduction 4th paragraph: the process parameters have correlations not only within the same stage but also among different stages. Thus model will integrate the key parameters from different stages at the same time)**

Regarding claims 15 and 17:

Yang discloses selecting the solder printing, part mounting, and reflow condition from a plurality of simulated conditions **(figure 10: input parameters).**

Regarding claims 16 and 18:

Yang discloses the program of claim 15 wherein the plurality of conditions include solder conditions, printing mask conditions, printing device conditions, substrate conditions, mouning device conditions, solder printing conditions, part conditions, and reflow furnace conditions **(figure 10: input parameters).**

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang ("Modeling and Implementation of a Neurofuzzy System for Surface Mount Assembly Defect Prediction and Control") in view of **Sarvar et al. ('Effective Modeling of the Reflow Soldering Process: Basis, Construction, and Operation of a Process Model').**

Regarding claim 3:

Yang does not explicitly disclose executing the simulation of the second step by executing an interpolation calculation using the analysis result data which is simulated based on an analyzed condition of the second condition. **Sarvar discloses** executing the simulation of the mounting step by executing an interpolation calculation using the analysis result data which is simulated based on a preceding or succeeding condition of the part mounting condition **(page 131 'Modeling Variable Materials Data' paragraphs 1-3: varying the specific heat capacity to record the temperature changes).** The variable behavior of the specific heat capacity is represented in the models using *interpolation tables for each variable material.* **Sarvar discloses** simulating a typical reflow profile **(page 128 'Radiative Heating').** The temperature is varied with time *(conditions)*, and this data is used to calculate the output. Therefore, the output *(analysis data)* is calculated during *each* temperature variation. The Examiner interprets 'analysis result data' to be any data produced in the first simulation step that is then analyzed and/or sampled in the second simulation step, and 'wherein analysis result data simulated previously based on a plurality of conditions are generated every step' to mean that this data is produced at every step. At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Yang and Sarvar because Sarvar discloses a method that may be utilized for optimizing the design for subsequent manufacture prior to final design commitment **(Sarvar: Introduction)**.

Regarding claim 9:

Yang does not explicitly disclose executing the simulation to contain production variation in the solder printing step, the part mounting simulation condition deciding step decides the result simulated in the solder printing simulation executing step to contain the production variation as the part mounting simulation condition and the part mounting simulation executing step executes the simulation of the part mounting step based on the part mounting condition which contains the production variation. **Sarvar discloses** a mounting process simulation program according to claim 1, wherein the first simulation executing step executes the simulation to contain production variation in the first step **(Table III: production variation specific heat capacity)**, the simulation condition deciding step decides the result simulated in the first simulation executing step to contain the production variation as the simulation condition and the second simulation executing step executes the simulation of the second step based on the second condition to contain the production variation **(Table III: simulation to determine variation in temperature due to variation in specific heat capacity).** At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the teachings of Yang and Sarvar because Sarvar discloses a method that may be utilized for optimizing the design for subsequent manufacture prior to final design commitment **(Sarvar: Introduction).**

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. **Examiner's Remarks:** Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner. In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shambhavi Patel whose telephone number is (571) 272-5877. The examiner can normally be reached on Monday-Friday, 8:00 am – 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-2279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SKP

/Hugh Jones/

Primary Examiner, Art Unit 2128